Honeywell

Analytical Products Demonstration Kit Manual

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Revision 1

Notices and Trademarks

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Honeywell Process Solutions

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About This Document

Abstract

This document provides descriptions for Preparation, Overview, Key Features, Operator Interface Communications of UDA2182 and Sensors.

Release Information

Analytical Products Demonstration Kit Manual, # 70-82-25-150 (this document) – 1st Release, May 2014

Reference Information

The following list identifies publications that may contain information relevant to the information in this document.

70-82-25-119, UDA2182 Universal Dual Analyzer Product Manual

70-82-25-126, UDA2182 Communications User Guide

70-82-25-137, Process Instrument Explorer Configuration Software User Manual

Patent Notice

The Honeywell ST 800 SmartLine Pressure Transmitter family is covered by one or more of the following U. S. Patents: 5,485,753; 5,811,690; 6,041,659; 6,055,633; 7,786,878; 8,073,098; and other patents pending.

Support and Contact Information

For Europe, Asia Pacific, North and South America contact details, see back page or refer to the appropriate Honeywell Solution Support web site:

Honeywell Corporate	www.honeywellprocess.com
Honeywell Process Solutions	www.honeywellprocess.com/pressue-transmitters/
Training Classes	http://www.honeywellprocess.com/en-US/training

Telephone and Email Contacts

Area	Organization	Phone Number
United States and Canada	Honeywell Inc.	1-800-343-0228 Customer Service 1-800-423-9883 Global Technical Support
Global Email Support	Honeywell Process Solutions	ask-ssc@honeywell.com

Symbol Definitions

The following table lists those symbols used in this document to denote certain conditions.

Symbol	Definition
	This **CAUTION** symbol on the equipment refers you to the Product Manual for additional information. This symbol appears next to required information in the manual.
	**WARNING** **PERSONAL INJURY**: Risk of electrical shock. This symbol warns you of a potential shock hazard where **HAZARDOUS LIVE** voltages greater than 30 Vrms, 42.4 Vpeak, or 60 VDC may be accessible. Failure to comply with these instructions could result in death or serious injury.
	**ATTENTION,** Electrostatic Discharge (ESD) hazards. Observe precautions for handling electrostatic sensitive devices
	Protective Earth (PE) terminal. Provided for connection of the protective earth (green or green/yellow) supply system conductor.
	Functional earth terminal. Used for non-safety purposes such as noise immunity improvement. NOTE: This connection shall be bonded to protective earth at the source of supply in accordance with national local electrical code requirements.
	Earth Ground. Functional earth connection. NOTE: This connection shall be bonded to Protective earth at the source of supply in accordance with national and local electrical code requirements.
	Chassis Ground. Identifies a connection to the chassis or frame of the equipment shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.

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2. Describe the Physical Characteristics (Un-Powered unit)
3. Describe the Terminal Wiring assignments – PV and I/O (Un-Powered unit)
4. Describe the Operator Interface (Power on)
5. Demonstrate Analyzer Set-up Channel 1 pH and Channel 2 Conductivity
6. Demonstrate or discuss digital remote communication and configuration
7. Summarize Key End User Benefits with UDA2182 Analyzer
8. Describe key features of analytical sensors included in the kit

The demo procedure assumes that you are familiar with the operation of the UDA2182.

PREPARE THE UDA2182 ANALYZER FOR DEMONSTRATION:

Analyzers may also be demonstrated with actual pH electrodes or conductivity cells included. Wiring for the pH and conductivity probes are shown in the quick start and operation manuals. The quick start manual is attached.

However if you would like to use these for shows, you can jumper the boards are follows:

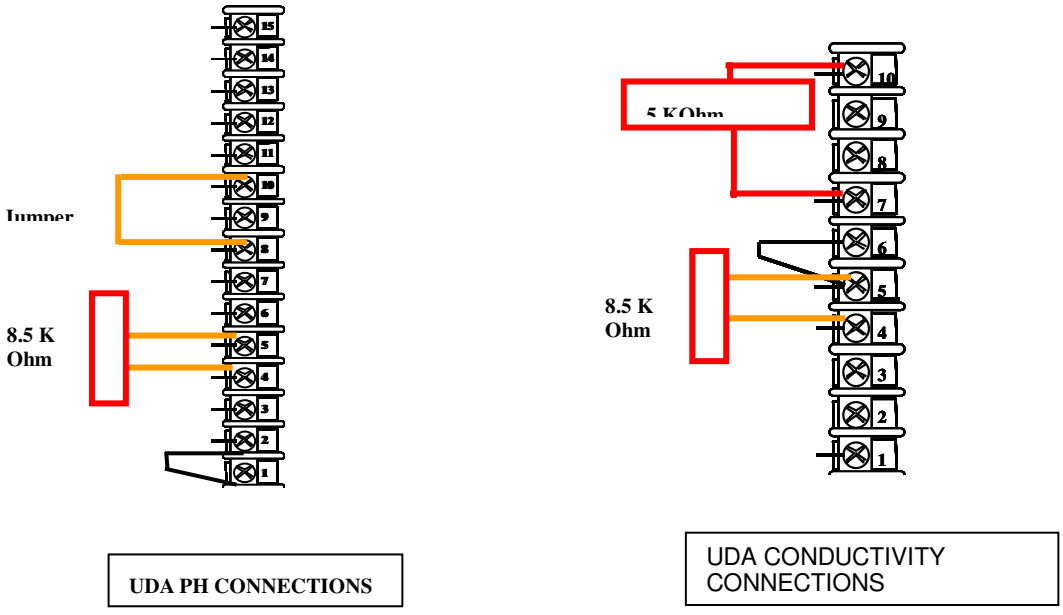


Figure 1 - UDA Connections

Simulated pH Input: On the pH input board jump terminals 8 and 10 to simulate 7 pH (or use the pH simulator included in the demo kit, see page 26 in this manual.) Install an 8.5 K Ohm resistor across terminals 4 and 5 to simulate 25°C (or set the temperature compensation to manual in the UDA2182). The jumper across terminals 5 and 6 should remain in place.

Simulated Conductivity Input: Set the Analyzer Cell Constant to 0.1 (the default). On the Conductivity input board install a 5K Ohm resistor across terminals 7 and 10 to simulate 20 µSiemens/cm (or connect resistance box provided in demo kit, see page 23 in this manual.) and an 8.5 K Ohm resistor across terminals 4 and 5 to simulate 25°C (or set the temperature compensation to manual in the UDA2182). The jumper across terminals 5 and 6 should remain in place.

1.1 Demonstration Equipment

UDA2182 model number included in this kit is UDA2182-PH1-CC2-NN-E-0E0C-EE.
This model provides:

- inputs (Input #1 for pH measurement and Input #2 for Conductivity measurement.)
- 4 to 20ma analog outputs
- SPDT alarm relays
- Infrared port[i]
    - Ethernet/RS485 Modbus Card[ii]
    - Printed Manual
    - PID Control/Advanced Features Option

1.2 Before Meeting the Customer

Review all product launch material prior to meeting with the customer. Focus on the competitive differentiator/value and feature/benefit tools to decide which 3-4 key points you will emphasize with that particular customer and then highlight those key points during the demonstration. If you are in doubt contact an Analytical Product Specialist or Product Manager for assistance.

1.3 Quick Product Overview of UDA2182

Give a brief description of the UDA2182 with emphasis on features relevant to the specific customer need and how the unique new features of the UDA2182 meet those needs.

- Single or Dual measurement in any combination of pH (Glass and Durafet), ORP, Contacting Conductivity and ppm / ppb Dissolved Oxygen probes.
- Graphic backlit LCD display providing continuous readout of process variables, alarm and diagnostic status.
- Infrared communications port enables fast and secure configuration via a Pocket PC or Infra red port-equipped laptop or desktop computer using Process Instrument Explorer software.
- Ethernet and RS485 communications provide IP addressing capability for continuous display of process variable data, event history and more.

[i] Demonstration Units are not supplied with Pocket PC's or PIE Software – these should be purchased by the Demonstrator / UDA owner if interested in demonstrating this capability.

[ii] Cables and PIE software are not included. PIE is not needed for most of the Ethernet demo.

- Capability to store multiple configurations for later review, modification or archiving.
- Electrically isolated inputs and outputs reduce ground loop problems.
- NEMA 4X packaging, making the analyzer impervious to moisture, dust or hose-down conditions.
- Multiple language prompts in English, German, French, Italian, Spanish. Turkish, Polish, Russian and Czech are optional.
- Easily field-upgradeable (user can change card types).
- Control Algorithms (On – Off, CAT, DAT, PFT, and PID control with AccuTune).
- Data Security through configurable 4-digit password code.
- Easy step through buffer, auto-buffer and sample procedures for pH.
- Calibration and Hold buttons on face for easy access.

1.4 UDA2182 Key Features and Customer Value

Feature	Benefit
Dual Channel Input	✓ Lower price per loop price versus single input devices
Mix-N-Match input types	✓ Lower inventory investment and less stock with one base instrument + input cards ✓ Purchase only what is required for the application ✓ Faster set-up time and commissioning with Plug and Play input boards
Graphic Backlit Display	✓ Facilitates simple/intuitive product configuration & operation ✓ Enables all parameters and status to be viewed in one glance for fast process status update
Infrared communications port	✓ Faster configuration, calibration, and troubleshooting ✓ Fewer environmental related failures by maintaining NEMA4X integrity.
PIE (Process Instrument Explorer) Software Option	✓ Reduced operator training expense using common Honeywell PIE software ✓ Low cost “configuration” tool on a common platform via commercially available Pocket PC ✓ Reduced configuration, calibration, and repair time to get up running faster.
Isolated inputs and outputs	✓ Eliminate nuisance service calls for the most common installation problems: ground loops and signal noise
NEMA 4X/IP66	✓ NEMA4X standard without additional cost for outdoor or wash down requirements.
Dual PID Control	✓ Easy set up with Accutune and manual methods to improve process control
Front panel diagnostic indication	✓ Reduced maintenance expense through fast and easy system troubleshooting
Easy to retrofit	✓ Lower retrofit cost with seamless fit into cut outs of 7082 / 9782 analyzers
Password protection	✓ Prevents unauthorized or accidental changes
Auto Clean and Calibration Cycle	✓ Timed system reduces maintenance requirements
Calibration History	✓ Shows slope and offset for trending and maintenance planning
Ethernet/Modbus Option	✓ Digital Outputs give more system details and internet

	capabilities to give remote access to process conditions
Calculated pH and Carbon dioxide	✓ Local displays give power plant users additional process information

1.5 Describe the 2 Channel Process Variable (PV) and Input/Output (I/O) Measurement Capability

(a) Show the client the layout of the connection terminals in the UDA2182.

(b) Explain the input / output capabilities for Current and Alarm Signals.

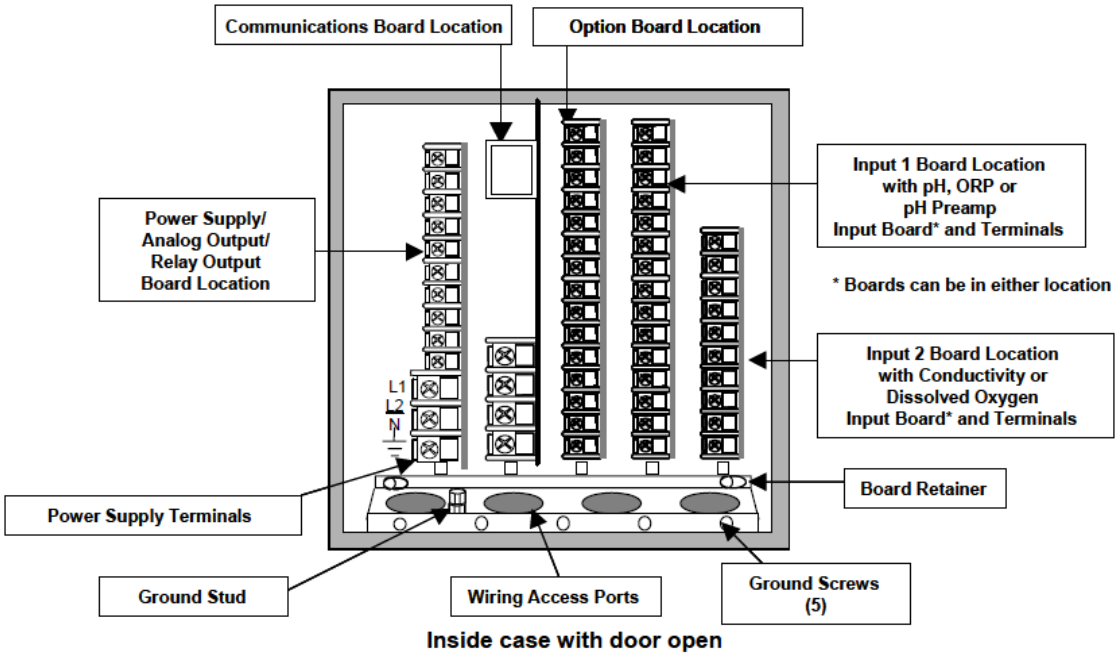


Figure 2 - UDA2182 Connection terminals

1.6 Describe the Operator Interface (Power on)

(a) Connect the Analyzer to a power source.

The analyzer has a Universal Power Supply capable of accepting an AC supply voltage between 90 – 264 VAC at a frequency between 47 and 63 Hz.

(b) Information at Power – Up.

Show the customer the immediate information displayed on the analyzer screen:
.i. Indication of BOOT Revision
.ii. FLASH TEST DATA – Complete test of electronics and software in the Analyzer

(c) Display.

"Walk through" the information available on the LCD display. Explain the details behind the legends displayed.

SCROLL THROUGH THE DISPLAY SCREENS DESCRIBING THE FUNCTIONALITY OF EACH SCREEN .

REFER TO THE INTUITIVE EASE OF PROGRAMMING THROUGH THE PLAIN TEXT MENU DRIVEN SOFTWARE, PLAIN TEXT DIAGNOSTICS AND ALARM INFORMATION.

HIGHLIGHT THE “LABEL” CAPABILITY SHOWING THAT EACH ANALYZER CAN UP TO TWO HEADINGS.

(d) Keypad.

Keyboard Orientation. Describe the keys and their function. Security code prevents tampering. Digital input can prevent keyboard changes.

Key	Function
Display	• When process values are on display: Use DISPLAY to cycle between PV Displays, PID Loop Displays, Auto Cycle Displays, Pharma Displays, Cation Display, Status Displays and an Event History Display. • In Setup mode, calibration mode, or calibration edit mode, use DISPLAY to abort current mode and return to the last accessed online display.
Hold	• Engages hold of analog and digital values at their current values and any relays assigned to alarm events or control are deactivated. **ATTENTION:** This takes precedence over the FAILSAFE function.
Setup	• Selects the configuration main menu when online, in calibration mode, or at a calibration submenu.
Exit	• In configuration menu, exits submenu to parent menu. If at configuration main menu, selects current online display. • In configuration edit mode, aborts editing of current parameter. • When online, acknowledges current alarm event to stop the flashing of the relay indicator and status message area.
Calibrate	• Selects the calibration main screen when online, in configuration mode or at another calibration screen.
▲ or ▼	• When a Setup configuration menu or configuration edit screen is on display: Use Up/Down keys to highlight a different item. • In configuration edit mode, either selects the parameter character or numerical digit to change or selects an enumerated parameter value: Use Up/Down key to increment the value of the digit at the cursor. Increases/decreases the selected parameter value. • When in display mode, use up/down keys to adjust the contrast on the screen.
◀ or ▶	• In configuration edit mode, selects the character or digit to change. • In calibration mode, selects the next or previous calibration screen. • In display mode, selects a single or dual display on a unit with dual input.
Enter	• In configuration menu, selects edit mode for selected parameter. • In configuration edit mode, saves edited parameter selection or value. • In calibration mode, selects parameters to reset and the next calibration screen.

1.7 Configure for pH measurement on Channel #1 and for Conductivity measurement on Channel #2.

CONFIGURATION PARAMETERS ARE HIGHLIGHTED IN THE FOLLOWING TABLES: -

Accessing Inputs Menu

- Press Setup to display the Main menu.
- Use the ▲▼ keys to select **"Inputs"** then press ↵ to enter the sub-menu.
- Press ▲▼ to highlight the desired menu selection then press ↵ to display the group of parameters.

Table 1 – Configuration Parameters

Sub-menu selection	Parameter	Selection or Range of Setting	Parameter Definition
Input 1 or 2 Direct pH **ORP**	PV Type	pH Glass pH HPW **pH Durafet (default)** ORP	The PV type determines the numerical format and the units of measure on the online PV display. Measured PV is generally displayed in the highest decimal precision possible to .001 and has a potentially displayable range of 0.000 to 99999. The exceptions are dissolved oxygen, pH, ORP and temperature, which are displayed with fixed decimal precision. PV Type determines specific ranges.
	PV Range	0.0 to 14.0 pH -1600 to 1600 ORP	Read Only
	Temp Input (ORP only)	Enable Disable	Enable to allow "Temp Type" selection – see below.
	Temp Type	**8550Ω Therm (default)** 1000Ω RTD Manual	8550Ω Thermistor 1000Ω Resistance Temperature Detector Manual

<table>
<tr><th>Sub-menu selection</th><th>Parameter</th><th>Selection or Range of Setting</th><th>Parameter Definition</th></tr>
<tr><td></td><td>Temp Deg F or C (Temp Type = Manual)</td><td>14.0 to 230.0°F
default = 77°F

-10 to 110°C
default = 25°C</td><td>Temp Deg F or C will appear depending on what Temperature Unit was selected in “Maintenance” setup group, parameter “Temp Units”.</td></tr>
<tr><td></td><td>Solu Temp Comp

(Not ORP)</td><td>None (default)
Custom
H_20
NH_3
Phosphate
Morpholine</td><td>
Enter “Solution pH/°C” value
Pure Water
Ammonia
Phosphate
Morpholine</td></tr>
<tr><td></td><td>Solution pH/°C

(Solu Temp Comp = Custom)

(Not ORP)</td><td>0.000 (default)
to
-0.050</td><td>Measured pH is displayed and transmitted normalized to a solution temperature of 25°C as determined by the current Solution Temperature Coefficient. This is expressed in units of pH/°C with precision to the hundredths decimal place. The parameter “Solu Temp Coeff” allows the selection of the following entries. Follow the “General Rules for Editing” in section 6.4.1 to make the changes. (-) Will appear when first digit to the right of decimal point is changed.

Solution Type — Temp Coefficient
None (Default) — 0.000
H_2O (Pure Water) — -0.016
NH_3 (Ammonia) — -0.032
PO_4 (Phosphate) — -0.032
C_4H_9NO (Morpholine) — -0.032
Custom — User Entry</td></tr>
<tr><td></td><td>PV Bias</td><td>-99999 to 99999
default = 0.00</td><td>PV Bias Constant - is used to compensate the input for drift of an input value.</td></tr>
<tr><td></td><td>Failsafe</td><td>-99999 to 99999
default = 14.00</td><td>The output value to which the output will go to protect against the effects of failure of the equipment.</td></tr>
<tr><td></td><td>Filter Time</td><td>0 to 120
default = 0</td><td>A software digital filter is provided for dampening the process noise. This filter is applied before the limit functions.</td></tr>
</table>

<table>
<tr><th>Sub-menu selection</th><th>Parameter</th><th>Selection or Range of Setting</th><th>Parameter Definition</th></tr>
<tr><td>Input 1 or Input 2 Conductivity</td><td colspan="3">For every cell constant the PV type includes selections for both conductivity µS/cm and conductivity mS/cm.
Conductivity µS/cm displays µS/cm and provides standard range solution type selections: None, NaCl, Morpholine, HCL, Acid, and NH3.
Conductivity mS/cm displays mS/cm and provides wide range solution type selections: None, HCl, NaCl, H2SO4, and NaOH.

Upper range limit defaults according to the table below:

For every cell constant the PV type also includes selections for either TDS ppb/TDS ppm or TDS ppm/TDS ppt.:
TDS ppb/ppm provides standard or wide solution type selections and
TDS ppm/ppt provides standard or wide solution type selections. Solution selections are the same as above with the exception of None.
Upper range limit defaults according to the table below:
<table>
<tr><th>Cell Const 0.01</th><th>Cell Const 0. 1</th><th>Cell Const 1</th><th>Cell Const 10</th><th>Cell Const 25</th><th>Cell Const 50</th></tr>
<tr><td>0 - 2 µS/cm displayable to 200 µS/cm
0 - 0.2 mS/cm
0 - 2000 ppb TDS
0 - 200 ppm TDS</td><td>0 - 20 µS/cm displayable to 2000 µS/cm
0 - 2 mS/cm
0 - 20000 ppb TDS
0 - 2000 ppm TDS</td><td>0 - 200 µS/cm displayable to 20000 µS/cm
0 - 20 mS/cm
0 - 200 ppm TDS
0 - 20 ppt TDS</td><td>0 - 2000 µS/cm displayable to 99999 µS/cm
0 - 200 mS/cm
0 - 2000 ppm TDS
0 - 200 ppt TDS</td><td>0 - 20000 µS/cm displayable to 99999 µS/cm
0 - 500 mS/cm
0 - 10 % conc displayable to 20%</td><td>0 - 20000 µS/cm displayable to 99999 µS/cm
0 - 1000 mS/cm
0 - 20 % conc</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Sub-menu selection</th><th>Parameter</th><th>Selection or Range of Setting</th><th>Parameter Definition</th></tr>
<tr><td></td><td>PV Type

Select Cell Constant First</td><td>Cond µS/cm (NIST-default)*
Cond mS/cm – (NIST)
Concentrtn
TDS ppb
TDS ppm
TDS ppt
Resistivity

Cond mS/m (ISO-Default)*
Cond S/m – (ISO)
Concentrtn
TDS ppb
TDS ppm
TDS ppt
Resistivity
Cond µS/m

* parameter selected in MAINTENANCE → INPUTS menu</td><td>These selections are only available with regard to the Cell Constant selected (See “Cell Constant”).
<table>
<tr><th>Cell Constant</th><th>Available Selectable PV Types
Use the ▲▼ keys to select</th></tr>
<tr><td>0.01</td><td>Conductance µS/cm (default- NIST), Conductance mS/cm (NIST), Conductance mS/m(default - ISO), Conductance S/m (ISO), TDS ppb, TDS ppm, Resistivity, Conductance µS/m (ISO)</td></tr>
<tr><td>0.1 (Default)</td><td>Conductance µS/cm (default- NIST), Conductance mS/cm (NIST), Conductance mS/m(default - ISO), Conductance S/m (ISO), TDS ppb, TDS ppm, Resistivity, Conductance µS/m (ISO)</td></tr>
<tr><td>1</td><td>Conductance µS/cm (default- NIST), Conductance mS/cm (NIST), Conductance mS/m(default - ISO), Conductance S/m (ISO), TDS ppm, TDS ppt,</td></tr>
<tr><td>10</td><td>Conductance µS/cm (default- NIST), Conductance mS/cm (NIST), Conductance mS/m(default - ISO), Conductance S/m (ISO), TDS ppm, TDS ppt.</td></tr>
<tr><td>25</td><td>Concentration (default), Conductance µS/cm (default- NIST), Conductance mS/cm (NIST), Conductance mS/m(default - ISO), Conductance S/m (ISO),</td></tr>
<tr><td>50</td><td>Concentration (default), Conductance µS/cm (default- NIST), Conductance mS/cm (NIST), Conductance mS/m(default - ISO), Conductance S/m (ISO),</td></tr>
</table></td></tr>
<tr><td></td><td>PV Range</td><td></td><td>Read Only</td></tr>
<tr><td></td><td>Cell Constant *</td><td>0.01
0.1 (default)
1
10
25
50</td><td>The Cell Constant is a value specific to a category of cells for the measurement range required.</td></tr>
<tr><td></td><td>Cal Factor *</td><td>0.850 to 1.150
default = 1.000</td><td>The Cal Factor is a correction value applied to the cell’s Cell Constant, which is unique to each cell to take into account tolerances in manufacture.

If a standard cell is attached to the sensor, the Cell Constant defaults to “0.1” and the Cal Factor defaults to “1.000”. These standard cell parameter values are editable and are retained through a power cycle.</td></tr>
<tr><td></td><td colspan="3">*Cell Constant and Cal Factor are automatically uploaded from Honeywell conductivity cells with EEPROM (blue & brown leads) and these values cannot be edited.</td></tr>
</table>

Sub-menu selection	Parameter	Selection or Range of Setting	Parameter Definition
	TDS Factor **(only PV Type TDS)**	0.010 **1.000(default)** 2.000	The TDS Factor is a conversion value applied to conductivity to derive total dissolved solids, in units of ppm per µS/cm.
	Temp Type	**8550Ω Therm (default)** 1000Ω RTD Manual	8550Ω Thermistor 1000Ω Resistance Temperature Detector Manual
	Temp Deg C or F	-10.0 to 140.0°C 14 to 284°F	If "Manual" is selected at "Temp Type" -Temp Deg F or C will appear depending on what Temperature Unit was selected in "Maintenance" setup group, parameter "Temp Units".

<table>
<tr><th>Sub-menu selection</th><th>Parameter</th><th>Selection or Range of Setting</th><th>Parameter Definition</th></tr>
<tr><td></td><td>Solu Temp Comp</td><td>None
Custom
H20
NH3
PO4
C4H9NO
HCl
NaCl (default)
H2SO4
NaOH</td><td>Measured Conductivity and Resistivity can optionally be temperature compensated to 25°C for a specific solution type. TDS and concentration are always measured based on a specific solution type. The cell constant and measurement type determines which solution types are available for selection, according to the table below:
<table>
<tr><th>Cell Constant</th><th>Available Selectable Solution Types
Use the ▲▼ keys to select</th></tr>
<tr><td>0.01</td><td>None (Conductivity/Resistivity only),
NaCl (µS/cm, mS/cm, TDS ppb, TDS ppm),
NH_3 (µS/cm, TDS ppb, TDS ppm),
C_4H_9NO (µS/cm, TDS ppb, TDS ppm),
H2SO4;HCL;NaOH (mS/cm)</td></tr>
<tr><td>0.1
(Default)</td><td>None (Conductivity/Resistivity only),
NaCl(µS/cm, mS/cm, TDS ppb, TDS ppm),
NH_3(µS/cm, TDS ppb, TDS ppm),
C_4H_9NO (µS/cm, TDS ppb, TDS ppm),
H_2SO_4;HCL;NaOH (mS/cm)</td></tr>
<tr><td>1</td><td>None (Conductivity only),
NaCl (µS/cm, mS/cm, TDS ppm, TDS ppt),
NH_3 (µS/cm, TDS ppm),
C_4H_9NO (µS/cm, TDS ppm),
H_2SO_4;HCL;NaOH (mS/cm, TDS ppt)</td></tr>
<tr><td>10</td><td>None (Conductivity only),
NaCl (µS/cm, mS/cm, TDS ppm, TDS ppt),
NH_3 (µS/cm, TDS ppm),
C_4H_9NO (µS/cm, TDS ppm),
H_2SO_4;HCL;NaOH (mS/cm, TDS ppt)</td></tr>
<tr><td>25</td><td>None (Conductivity only),
HCl (mS/cm, Concentration),
NaCl (µS/cm, mS/cm, Concentration),
H_2SO_4 (mS/cm, Concentration),
NaOH (mS/cm, Concentration)</td></tr>
<tr><td>50</td><td>None (Conductivity only),
HCl (mS/cm, Concentration),
NaCl (µS/cm, mS/cm, Concentration),
H_2SO_4 (mS/cm, Concentration),
NaOH (mS/cm, Concentration)</td></tr>
</table></td></tr>
<tr><td></td><td>Wire Len Feet *</td><td>0 to 1000 ft
default = 0</td><td rowspan="2">Refer to appendix 15.2 to enter values for lead wire resistance compensation</td></tr>
<tr><td></td><td>Wire Len Meters *</td><td>0 to 304.80
default = 0</td></tr>
</table>

Sub-menu selection	Parameter	Selection or Range of Setting	Parameter Definition
	Wire Size AWG *	16 AWG **18 AWG(default)** 20 AWG 22 AWG	
	Wire Size Sq mm *	0.33 to 2.08 **default = 0.82**	
	Pharma Type	None PhEur USP **default = None**	PhEur - Pharmacopoeia Europa USP - United States Pharmacopoeia standard procedure stages for determining Purified Water
	Pharma PV High	-99999.00 to 99999.00 **(default 10.000)**	Pharma PV High Value – Measured solution conductivity value scaled for 100%
	Pharma PV Low	-99999.00 to 99999.00 **(default 0.000)**	Pharma PV Low Value - Measured solution conductivity value scaled for 0%
	Pharm Tmr Mins	000.0 to 120.0 **(default 10.000)**	**Pharma Timer Minutes** - If the Pharma sample does not pass the Stage 1 conductivity requirement a **Fail signal** is generated, then the State 2 and Stage 3 tests are conducted. When the Stage 2 or Stage 3 test is successful, the fail signal is cancelled and the **Pharma Timer begins to count down from the configured minutes value set here.** When the Timer countdown is completed, the Pharma function block returns to Stage 1.
	PV Bias	-9999.00 to 9999.00 **default = 0.000**	PV Bias Constant - is used to compensate the input for drift of an input value.
	Failsafe	0.0 to 2000 **default = 2000.000**	The output value to which the output will go to protect against the effects of failure of the equipment.
	Filter Time	0 to 120.0 **default = 0.000**	A software digital filter is provided for dampening the process noise and is applied before the limit functions.

Sub-menu selection	Parameter	Selection or Range of Setting	Parameter Definition
Input 1 or Input 2 DO *Dissolved Oxygen*	PV Type	DO% Sat **DO Concen (default)**	The concentration of oxygen dissolved in water (or other liquid) may be described by either "dissolved oxygen **(DO) concentration**" or **percent saturation**. The units for DO are either parts per million - PPM (equivalent to milligrams per liter) or parts per billion - PPB (equivalent to micrograms per liter). The units of saturation are percent where 100% saturation is equivalent to the concentration of oxygen dissolved in air-saturated water. For instance, at 25°C and one atmosphere pressure, 8.24 ppm = 100% saturation. Although the ppm and ppb concentration units are the most frequently used units by far, % saturation may be appropriate for non-aqueous liquids like vegetable oil.
	PV Range	0 – 200 ppb, displayable to 20000ppb 0-20 ppm 0 – 100% sat, displayable to 200% sat	Read Only
	Temp Type	**5000Ω Therm Default** 1000Ω RTD Manual	5000Ω Thermistor 1000Ω Resistance Temperature Detector Manual
	Temp Deg C or F (Temp Type = Manual)	0 to 60°C 32 to 140°F	Temp Deg F or C will appear depending on what Temperature Unit was selected in "Maintenance" setup group, parameter "Temp Units".
	Salinity Type	**Manual (default)** Conduc Input	Salinity is used to correct for salt in the process water. Manual Valid only if conductivity board is present.
	Salinity ppt *"Manual" Salinity type only*	0.00 to 40.00ppt **default = 0.00**	(parts per thousand) as sodium chloride 0.0 = No selection
	Pressure Type	Manual **Sensor (default)**	Allows manual entry of atmospheric pressure compensation Internal sensor for atmospheric pressure compensation during air calibration
	Pressure mm Hg *(Manual Pressure type only)*	500.0 to 800.0 **default = 760 mmHg**	Atmospheric pressure compensation. Enter a value in mmHg.

Sub-menu selection	Parameter	Selection or Range of Setting	Parameter Definition
	PV Bias	-20.00 to 20.00 PPM -20000 to 20000 PPB **default = 0.000**	PV Bias Constant - is used to compensate the input for drift of an input value. If PPM Board is installed. If PPB Board is installed.
	Failsafe	0.000 to 20.00 PPM 0.000 to 20000 PPB **default = 20.000**	The output value to which the output will go to protect against the effects of failure of the equipment. If PPM Board is installed. If PPB Board is installed.
	Filter Time	0 to 120.0 **default = 0.0**	A software digital filter is provided for dampening the process. The units are in time constant seconds.

1.8 Process Instrument Explorer Software and Digital Communications

Take the opportunity to explain the full capabilities of UDA2182 using the Infrared communications feature with PIE (Process Instrumentation Explorer) and Website capabilities.

.

Process Instrument Explorer lets you configure your analyzer on a desktop/laptop or Pocket PC

Explain the features:

- Create configurations with intuitive software program running on a Pocket PC, a Desktop or a laptop computer. ·
- Create/edit configurations live, just connect software to analyzer via comm port :
- Create/edit configurations offline and download to analyzer later via comm. port:
- Infrared port available on every UDA2182
- This software is available in English, Spanish, Italian, German and French.

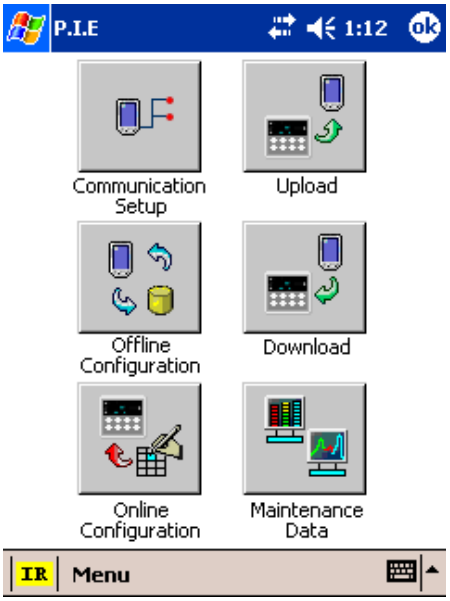


Figure 3 - Process Instrument Explorer Menu (PIE)

Infrared communications

The infrared connection provides a non-intrusive wireless connection with the instrument and maintains NEMA4X AND IP66 integrity.

No need to get access to the back of the analyzer to communicate with the instrument, no need to take your screw driver to wire the communication cable, no wiring mistake possible. You can now duplicate an instrument's configuration, upload or download a new configuration in a matter of seconds, just by pointing your Pocket PC in the direction of the instrument.

It takes just a few seconds to upload a configuration from an instrument. You can then save the configuration file onto your PC or pocket PC for review, modification or archiving. Furthermore, this software also gives you important maintenance information on the analyzer: instantly, get information on the current operating parameters, digital inputs and alarm status, identify internal or analog input problems.

Question: What if I have several analyzers on the same panel? How can I be sure I am communicating with the correct one?

Answer: The infrared port of the analyzer is normally "off". You activate the infrared port on a particular analyzer by pressing any key. You can now communicate with the analyzer. If no communications are received for 2 minutes, the port will be shut down again.

Internet Communications

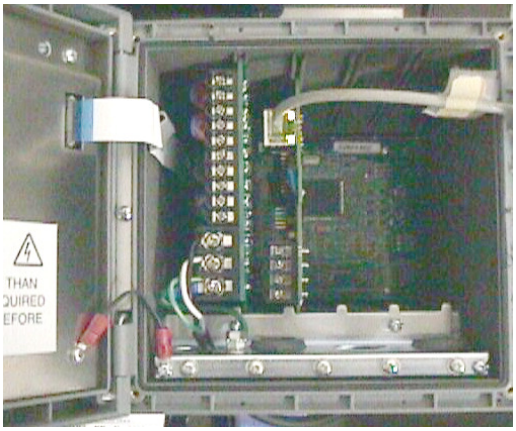


Figure 4 - Internet Communications

Ethernet port

You can demo the Ethernet capabilities starting from the Setup Menu/Communication. To access the web pages, you need to know the IP address of the UDA.

- The default address is 192.168.1.254.
- If you want to use the default, your computer's network card must be configured to work on the 192.168.1.xxx subnet.

Note: you cannot have your computer connected to a network if you want to connect it directly to your PC unless your PC is equipped with two network ports.

The optional Ethernet port provides:

- Up to 5 Modbus simultaneous TCP connections
- Ethernet parameters are configured via the front panel or web pages.
- Web server with up to 10 clients simultaneously
- Web pages setup the Ethernet port settings and monitor readings, alarms, statuses, events
- Multi-language Email to send alarm status changes.
- Alarm notification to eight email addresses.

- DHCP: (Dynamic Host Configuration Protocol) or static IP

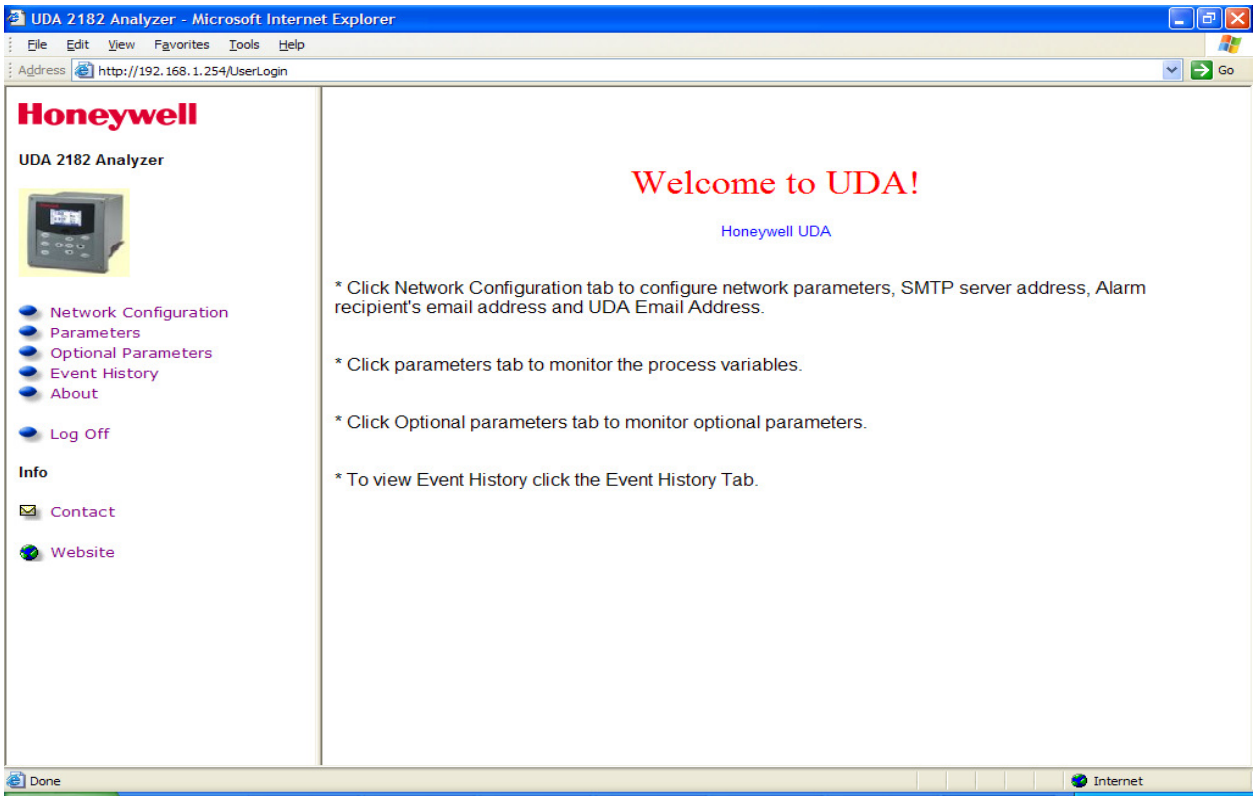


Figure 5 - UDA Web Access

Serial port

The optional Ethernet port provides:

- RS422/RS485 multi-drop
- 2400 to 115,200 programmable baud rate
- Modbus RTU protocol to read signals including PV, Temperature, Alarm Status, outputs, relay status, etc.
- Read/write four analog and four digital variables

1.9 Summarize UDA2182 Features

Review features that add value for the end user:

i. MIX AND MATCH INPUTS:
Take Away Message:

Dual input and the Mix-n-Match design reduces the per loop cost associated with pH, Conductivity and Dissolved Oxygen measurement

ii. Ethernet, Modbus, IR and PIE SOFTWARE:-
Take Away Message:

Wireless interface and software tools lower maintenance costs by providing additional easily accessible process information and local or remote updateability.

iii. EASY RETROFIT WITH EXISTING 9782 / 7082 ANALYZERS: -
Take - Away Message:

Same Form, Fit and Function saves installation, wiring and re-engineering costs.

iv. OPTIONAL PID WITH ACCUTUNE:-
Take Away Message:

PID Control uses time proven and field verified Honeywell control algorithms to improve product quality, ensure regulatory compliance and reduce operational costs.

1.10 Demo of Honeywell Analytical Sensor Capabilities

Show the ISFET (Ion Sensitive Field Effect Transistor) chip and the VarioPin connection. Mention that the H on the Honeywell label is lined up with the chip.

Durafet III pH Electrode Key Features:

- IP 68 – ideal for wet process environments or outdoor electrode locations.
- Less prone to breakage than glass pH electrodes
- Fast Speed of Response – up to 10 times greater than Glass electrodes.
- Refillable reference electrolyte - no reason to throw the electrode away when the electrolyte is depleted.
- Replaceable porous junction/probe tip

Durafet III

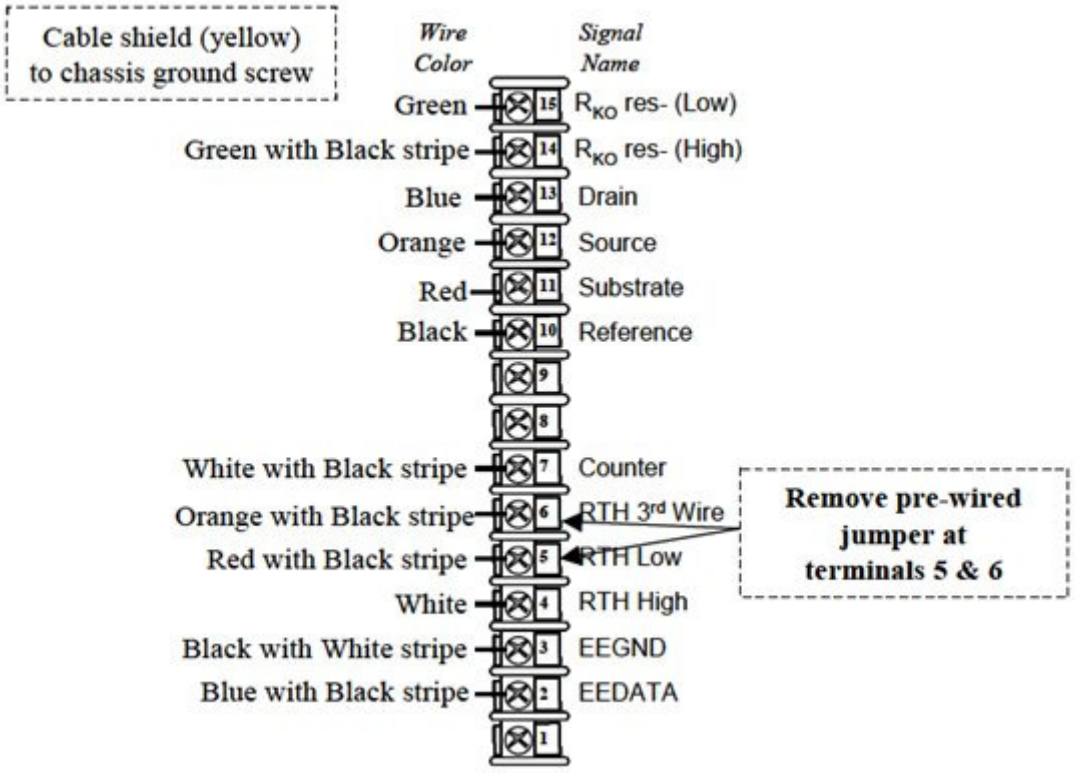


Figure 6 - Terminal Designations for Durafet III Electrodes

HB Series pH Probe:

Demonstrate with the HB cut-out how this is a proven method for applications that are harsh for references. Show how the silver reference wire is located wound up at the inside at the top. The schematic below shows how the larger and smaller rubber washers (isolation discs) and the usually potassium chloride saturated wooden dowels work to create a more difficult path for impurities to reach the wire.
Features:

- Large surface area glass measuring electrode for longer life in abrasive applications
- Teflon porous junction to reduce buildup on probe tips
- Axial Ion Path technology to greatly extend life of reference electrode in harsh applications
- Each probe customized for body type, hemi or flat glass, dual notch or flush tip, and mounting capability. Temperature compensation available in 8550, PT1000 and PT100 to allow use with various analyzers and transmitters.
- HB546 is for insertion with Honeywell CPVC insertion device, submersion or in-line with ¾ NPT threading on both ends.
- HB551 is for in-line applications with nut-loc adaptor. Nut-loc comes in CPVC and Delrin (150 psi max) or Stainless Steel (300 psi max)
- HB547 is the probe for use with a stainless steel insertion/removal device, maximum pressure 150 psig @150°C.

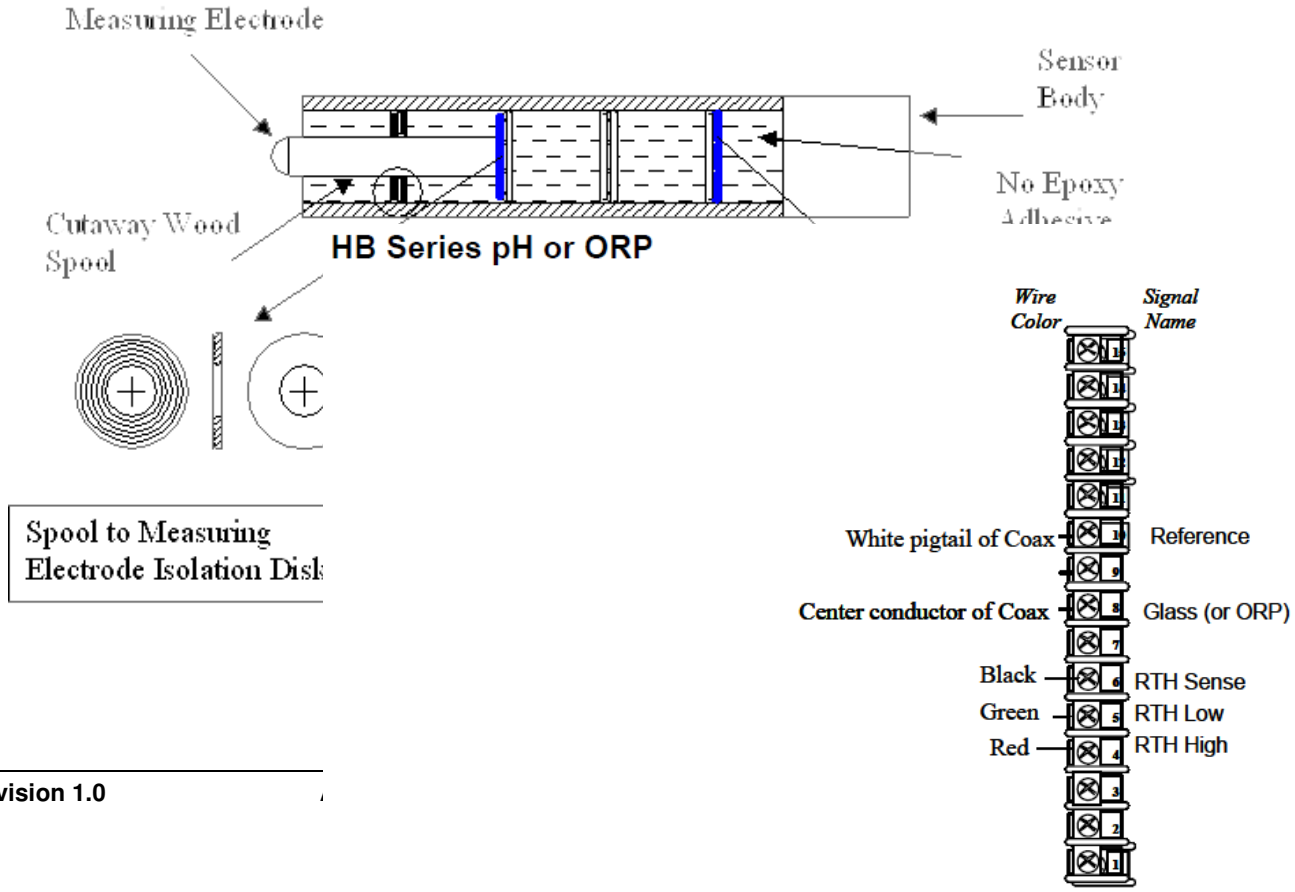


Figure 7

Figure 8 - Wiring for UDA2182 installation

HBD Series pH Probe (available Q12013):

Demonstrate the ISFET chip and Teflon porous junction at probe tip.

- Durafet measuring electrode reduces breakage. Ten times faster than glass.
- Measuring electrode of the HB series with similar superior reference protection
- Reduced frequency for calibration compared to other pH probes
- Same wiring to UDA2182 as Durafet III

HPW7000 pH for High Purity Water:

- Designed for accurate and stable pH measurement in water with conductivity less than 20 µS/cm
- Easy to refill electrolyte reservoir
- Measuring and reference electrodes have quick disconnect fittings
- Calibration cups for user-friendly calibration
- Optional panel

HPW7000

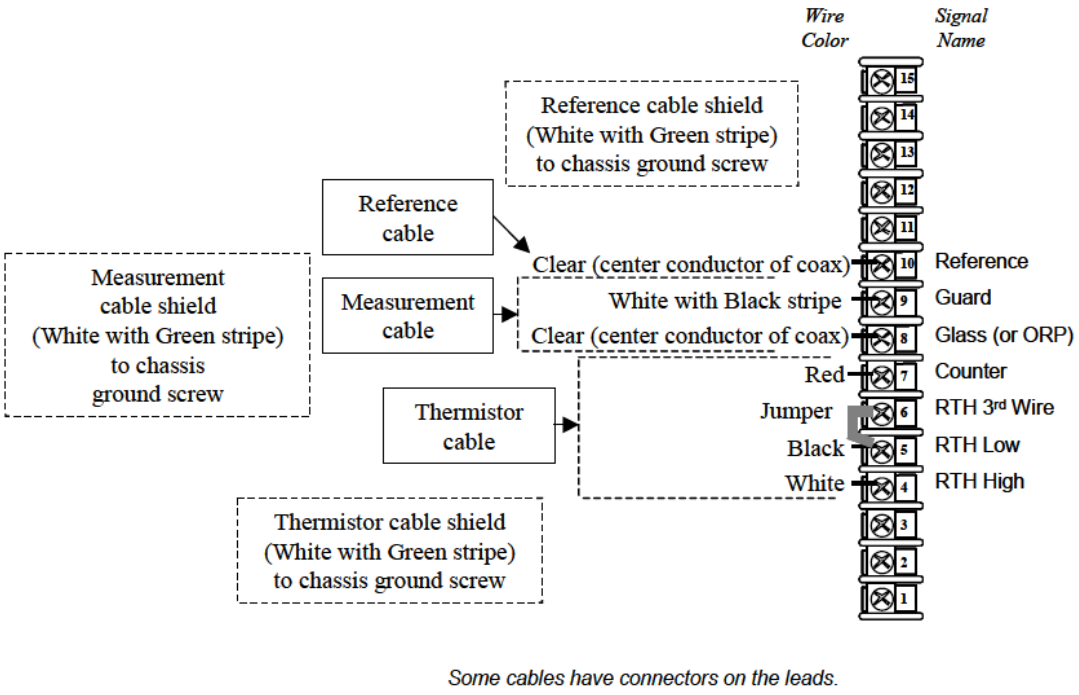


Figure 9 – Wiring for HPW7000

Honeywell DL5000 Dissolved Oxygen:

Remove the probe cap and demonstrate the platinum wire winding at the tip of the probe.

- Equilibrium technology with permanent membrane eliminates need to replace membranes, caps and electrolyte.
- Not flow dependent.
- Reduced frequency for calibration compared to membrane technologies
- Small profile compared to other technologies
- PPB and PPM probes to optimize applications
- Stainless Steel flow cell required for PPB.

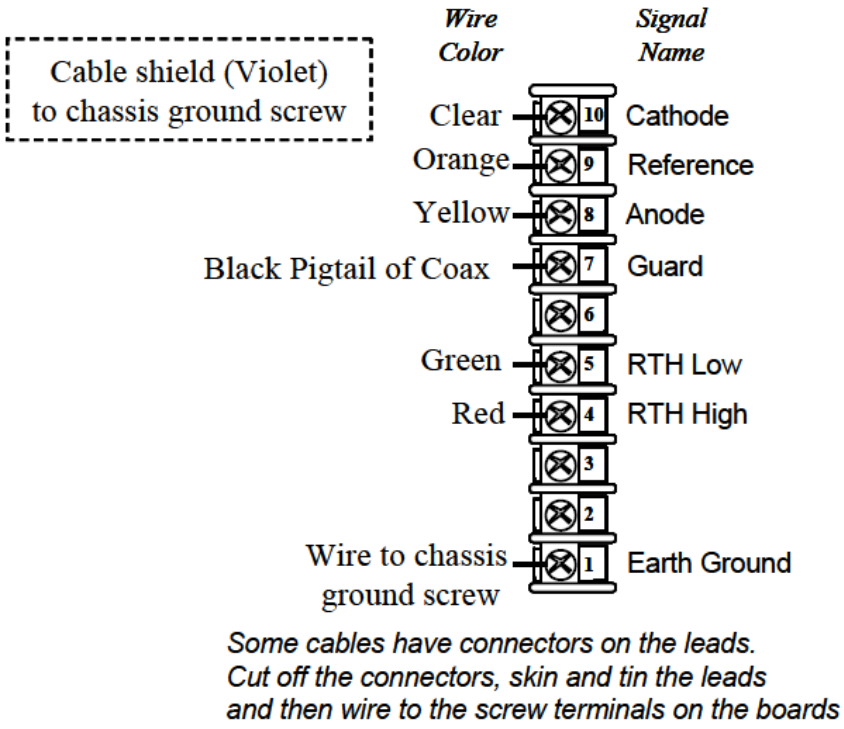


Figure 10 - Wiring for DO with Quick Disconnect Option

Honeywell 49XX Series Conductivity:

- All these sensors except 4908/4909 have the capability to upload cell constant and calibration factor data into the UDA2182 on installation (UDA2182 versions after 2009).
- Quick-disconnect option available for non-submersion applications
- Proven highly accurate technology
- A Decade Box is included to demo electronic conductivity calibration. See the following table to relate the measurements
- Conductivity can also be calibrated with standard solutions

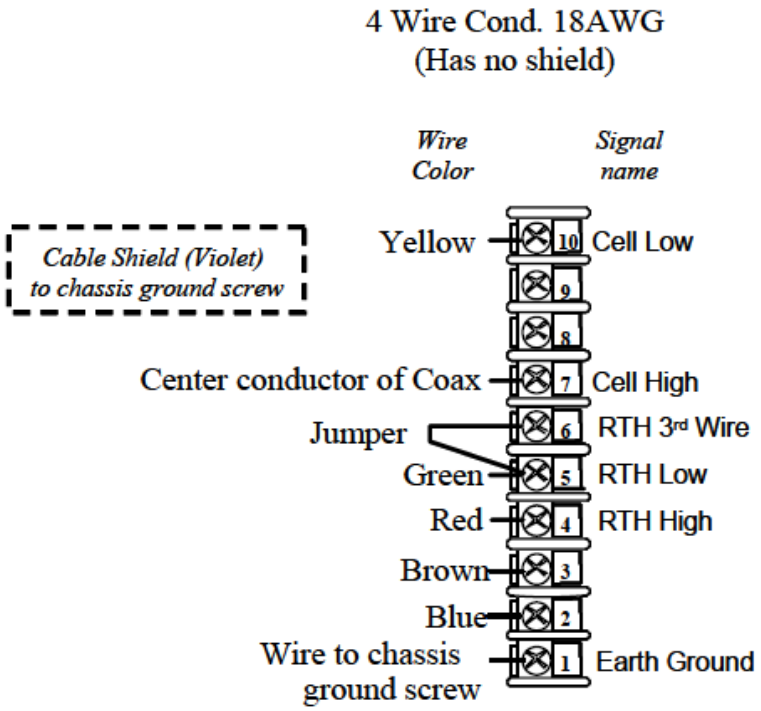


Figure 11 - Conductivity Wiring for Quick Disconnect

Table 2 - Conductivity and Resistance Values

Cell Constant		0.01	0.1	1	10	50	100
Conductivity				Resistance			
	0.055 µS	182 Kohm	1.82Mohm	18.2 Mohm	200 Mohm	2 Gohm	20 Gohm
	0.1 µS	100 Kohm	1 Mohm	10 Mohm	100 Mohm	1 Gohm	10 Gohm
	0.2 µS	50 Kohm	500 Kohm	5 Mohm	50 Mohm	500 Mohm	5 Gohm
	0.5 µS	20 Kohm	200 Kohm	2 Mohm	20 Mohm	200 Mohm	2 Gohm
	1 µS	10 Kohm	100 Kohm	1 Mohm	10 Mohm	100 Mohm	1 Gohm
	2 µS	5 Kohm	50 Kohm	500 Kohm	5 Mohm	50 Mohm	500 Mohm
	5 µS	2 Kohm	20 Kohm	200 Kohm	2 Mohm	20 Mohm	200 Mohm
	10 µS	1 Kohm	10 Kohm	100 Kohm	1 Mohm	10 Mohm	100 Mohm
	20 µS	500 ohm	5 Kohm	50 Kohm	500 Kohm	5 Mohm	50 Mohm
	50 µS	200 ohm	2 Kohm	20 Kohm	200 Kohm	2 Mohm	20 Mohm
	100 µS	100 ohm	1 Kohm	10 Kohm	100 Kohm	1 Mohm	10 Mohm
	200 µS	50 ohm	500 ohm	5 Kohm	50 Kohm	500 Kohm	5 Mohm
	500 µS	20 ohm	200 ohm	2 Kohm	20 Kohm	200 Kohm	2 Mohm
	1 mS (1000 µS)	10 ohm	100 ohm	1 Kohm	10 Kohm	100 Kohm	1 Mohm
	2 mS	5 ohm	50 ohm	500 ohm	5 Kohm	50 Kohm	500 Kohm
	5 mS	2 ohm	20 ohm	200 ohm	2 Kohm	20 Kohm	200 Kohm

	10 mS	1 ohm	10 ohm	100 ohm	1 Kohm	10 Kohm	100 Kohm
	20 mS	5 Mohm	5 ohm	50 ohm	500 ohm	5 Kohm	50 Kohm
	50 mS	2 mohm	2 ohm	20 ohm	200 ohm	2 Kohm	20 Kohm
	100 mS	1 mohm	1 ohm	10 ohm	100 ohm	1 Kohm	10 Kohm
	200 mS	500 mohm	5 mohm	5 ohm	50 ohm	500 ohm	5 Kohm
	500 mS	200 m ohm	2 mohm	2 ohm	20 ohm	200 ohm	2 Kohm
	1000 mS	100 m ohm	1 mohm	1 ohm	10 ohm	100 ohm	1 Kohm
	1999 mS	50 m ohm	5 mohm	500 mohm	5 ohm	50 ohm	500 oh
Cell Constant		0.01	0.1	1	10	50	100
Base Range for Cell Constant		0--2 µS	0-20 µS	0-200 µS	0-2 mS	0-20 mS	0-20 mS
Auto Range - UDA2182		0-200 µS	0-2 mS	0-20 mS	0-200 mS	0-1000 mS	0-1999 mS
Auto Range DL423		0-200 µS	0-2 mS	0-20 mS	0-200 mS	0-1000 mS	0-1999 mS

For Conductivity values not listed above, use the following equation:

Resistance = (Cell Constant) (1,000,000) / Conductivity in microSiemens/cm

IV. DirectLine Transmitters

DirectLine transmitters have the following features:

- Intrinsically Safe
- 2-wire transmitters
- Small profile fits in tough to fit areas
- Simple three button interface with 4 digit LCD display
- DL421 for pH will run with all 8550 temperature compensated pH probes from Honeywell.
- Other DirectLine transmitters are available for contacting conductivity and dissolved oxygen.

Sensorex

PRODUCT INSTRUCTION SHEET

Calibration Procedure (cont.)

7. With the "pH 7" light on, rotate the meter's "CALIBRATE" or "STANDARDIZE" control until the meter's display reads "**7.00**"

8. Press the C110's "pH4" button to select pH4 or "pH10" to select pH 10. The appropriate C110 light should turn on.

9. Rotate the meter's "SLOPE" button so that the meter reads the new value from Step 8.

10. Scan through 7.00, 10.00 and 4.00 by pressing the appropriate button on the face of the C110 to verify that the meter is properly calibrated.

11. Turn off the C110 by pressing the "OFF" button.

12. Disconnect the C110 and reconnect the pH electrode. Calibrate the pH meter with the electrode attached, following the meter manufacturer's instructions.

Battery Replacement

The C110 pH/ORP simulator is supplied with a 9V battery which comes installed in the unit. When the battery is depleted the ***LOW BATTERY*** light will be lit (see FIG 4). Replace the battery before using the C110 for any further calibration or troubleshooting. Any type of 9V battery can be used as a replacement.

To replace the battery follow the steps below:

1. Turn over the C110 to expose the backside (see FIG 5).
2. At the bottom of the case (opposite side of the BNR connector) is the battery cover. Remove the cover by pressing the indentation inward and pulling the cover downward (away from the unti). See FIG 5.
3. Remove the old battery by pulling it out of the case then removing the battery from the connectors. See FIG 6.
4. Get a new 9V battery and plug it into the connectors and insert into case as shown in FIG 7.
5. Replace the battery cover as shown in FIG 7.

FIG. 4

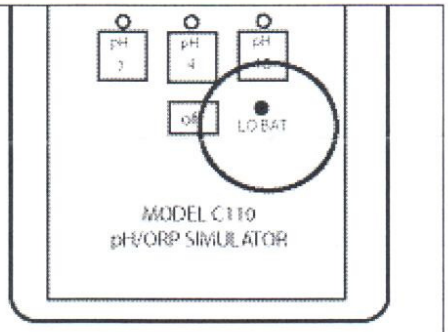


FIG. 5

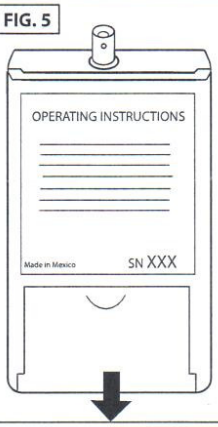
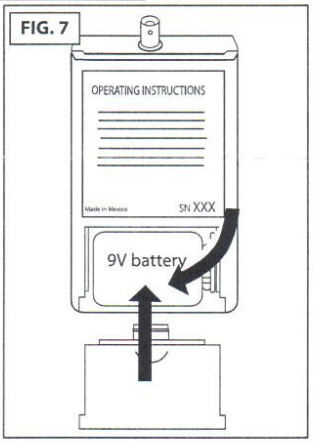


FIG. 6

FIG. 7



Parts covered by this product data sheet include:
C110

FORM: InstrC110 [Rev: 2011-06-27]

Sensorex

PRODUCT INSTRUCTION SHEET

C110 pH/mV Checker/Simulator

Product Instructions

Introduction

The C110 pH/mV checker simulator is a millivolt source that can be used to calibrate or check the calibration of a pH or ORP (mV) meter. It also serves as a troubleshooting toll when pH or ORP systems fail. For troubleshooting, the electrode is removed and the simulator is connected in its place. The C110 sends a signal to the meter to verify the performance of the meter. Signals of pH4, pH7 and pH10 are available, as well as +/-700mV for ORP. A properly working meter (by process of elimination) indicates that the electrode may be the cause of the failure.

FIG. 1

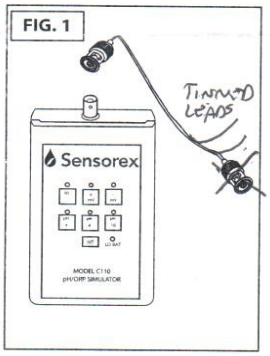
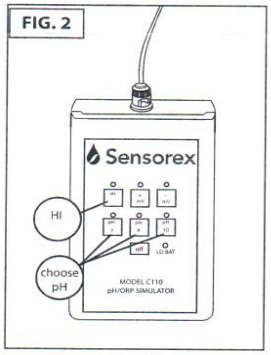


FIG. 2



Calibration Procedure

1. Plug the BNC connector of the black cable or other cable (CX2) into the top of the C110 at the BNR connector. (see FIG 1)

2. Disconnect the pH or ORP electrode from the meter.

3. Connect the C110 to the meter in the same way the electrode was connected. (see FIG 2.)

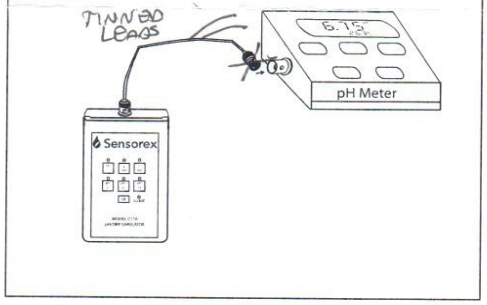
4. Turn on the C110 by pressing the desired pH or mV button

5. Press the "HIGH Ω" button to simulate pH electrode resistance load (the C110 has 1000 M Ω load). See FIG 3. Note: ORP does not require "HIGH Ω" button to be pressed since ORP electrode have low output impedance.

6. At this time it is best to follow the pH or ORP electrode calibration instructions in the manufacturer's manual.

The following instructions are given as general guidelines for either microprocessor or manual adjust pH meters.

FIG. 3



Parts covered by this product data sheet include:
C110

Sales and Service

For application assistance, current specifications, pricing, or name of the nearest Authorized Distributor, contact one of the offices below.

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